

Table 2

Copper-dependent enzymes

Oxidoreductases	Amine oxidase, flavin-containing (amine oxidase, monoamine oxidase, tyramine oxidase)	Metabolism of neurotransmitters—noradrenaline, dopamine, serotonin; and dietary amines—tyramine
	Amine oxidase, copper-containing (diamine oxidase, histaminidase)	Metabolism of amines—histamine, putrescine, cadaverine
	Protein-lysine 6-oxidase (lysyl oxidase)	Connective tissue synthesis—cross-linking of collagen and elastin
	Cytochrome-c oxidase (cytochrome oxidase)	Oxidative phosphorylation—electron transport in mitochondrial respiratory chain
	Superoxide dismutase (copper-zinc superoxide dismutase)	Antioxidant and free radical scavenging—conversion of superoxide radicals to hydrogen peroxide
	Ferroxidase I (ceruloplasmin)	Iron transport—oxidation of Fe^{2+} to Fe^{3+} to enable serum transport on transferrin Copper storage and transport Antioxidant and free radical scavenger
	Ferroxidase II	Iron transport—oxidation of Fe^{2+} to Fe^{3+} to enable serum transport on transferrin
Monooxygenases	Hephaestin (ferroxidase)	Iron transport—oxidation of Fe^{2+} to Fe^{3+} in intestinal cells to enable iron uptake
	Dopamine beta-monooxygenase (dopamine beta-hydroxylase)	Catecholamine synthesis—conversion of dopamine to noradrenaline
	Peptidylglycine monooxygenase (peptidylglycine alpha-amidating monooxygenase)	Peptide hormone maturation—amidation of alpha-terminal carboxylic acid group of glycine
Methylation cycle (potentially)	Monophenol monooxygenase (monophenol oxidase, tyrosinase)	Melanin synthesis—conversion of tyrosine to DOPA
	Methionine synthase (5-methyltetrahydrofolate-homocysteine S-methyltransferase)	Transfer of methyl group from methyltetrahydrofolate to homocysteine to generate methionine for the methylation cycle and tetrahydrofolate for purine synthesis
	Adenosylhomocysteinase (S-adenosylhomocysteine hydrolase)	Regeneration of homocysteine from adenosylhomocysteine in the methylation cycle

Copper is a co-factor in a range of oxidoreductases and monooxygenases, and may also have a regulatory role for two enzymes in the methylation cycle. Each enzyme is listed with its recommended name, other common names and biological role. Adapted from [87] with permission